

NASA



Astronaut Office

Astronaut Office

Risk Management and Safety Inputs

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Astronaut Office Safety Inputs

- **Situation:**
 - **Programs and Projects** accept **residual risk** on behalf of the risk takers.
 - Are the risk takers in the loop?
 - How do the Astronauts provide **safety inputs**?



Astronaut Office Safety Inputs

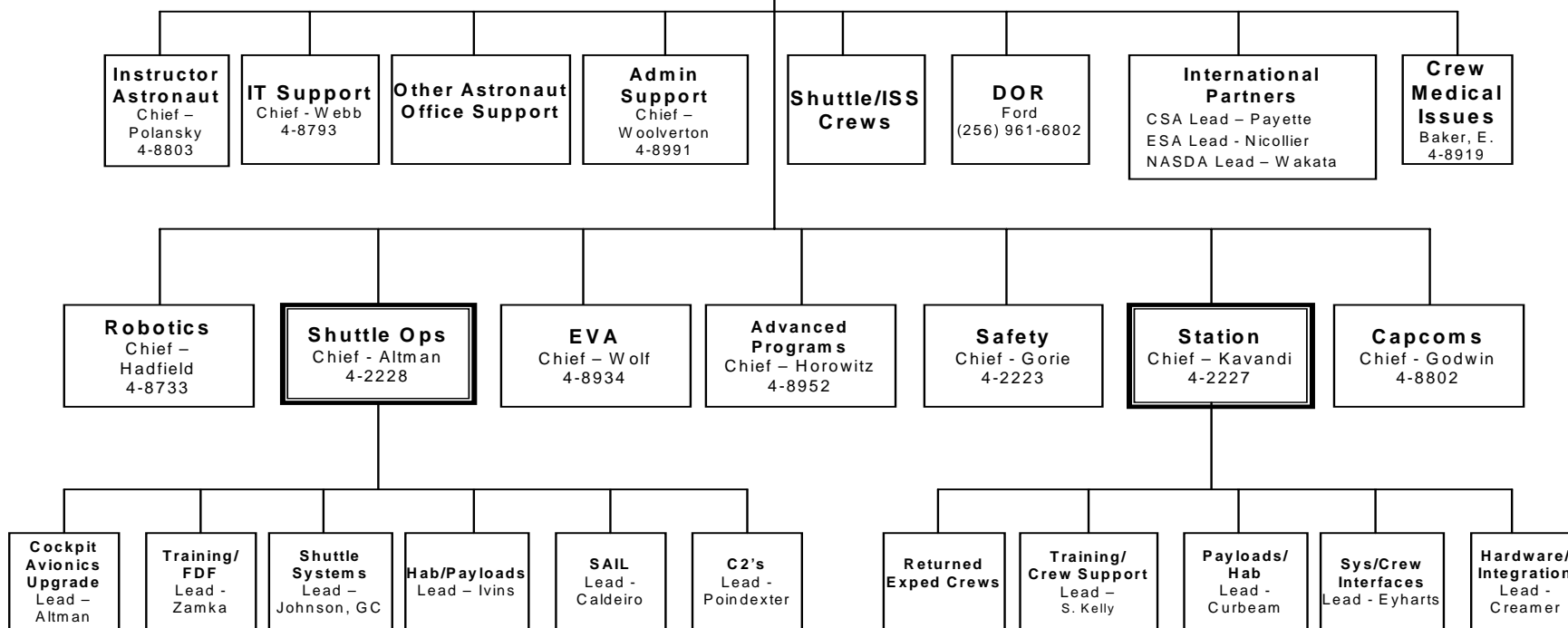
- **Astronaut Office Structure**
 - **Branches Organized to Support:**
 - Programs
 - Projects
 - Directorates
 - (Centers)
 - (Contractors)
 - International Partners
- **Astronaut Development**
 - **Constructive Training**



Astronaut Office Structure

Astronaut Office

Chief – Rominger, 4-8878
Deputy – Whitson, 4-8950
Technical Assistant – Hajek, 4-8993
Secretary – Vacant, 4-8657





Astronaut Office Safety Inputs

- **External Interface**

- Inputs to **Lower Levels** Preferable

- **Astronauts, Engineers**

- **Meetings:**

- Discussions
 - Forums
 - Boards

- **Tests:**

- Multi-Element Integration Test (MEIT)
 - Crew Equipment Interface Test (CEIT)
 - Terminal Countdown Demonstration Test (TCDT)



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Astronaut Office Representation Shuttle Meetings

<i>Monday</i>	VITT Hardware Status
<i>Monday</i>	CB Meeting
<i>Monday</i>	Space Shuttle Cockpit Council (SSCC)
<i>Monday</i>	CB Staff
<i>Monday - Friday</i>	Special PRCB
<i>Monday</i>	FOICB
<i>Monday</i>	GPS PRT
<i>Tuesday</i>	SICB
<i>Tuesday</i>	ORB
<i>Tuesday</i>	DT/CB Tagup
<i>Tuesday</i>	T&O
<i>Tuesday</i>	SMVF User's Forum
<i>Tuesday</i>	Ascent GN&C/Abort Panel
<i>Tuesday</i>	SASCB Preboard
<i>Tuesday</i>	Cockpit Avionics Upgrade (CAU) Executive IPT
<i>Tuesday</i>	Landing Officer Support Project (LOSP)
<i>Wednesday</i>	VMS Planning Meeting
<i>Wednesday</i>	OCCB
<i>Wednesday</i>	"ALFRED" Preboard

<i>Wednesday</i>	POCCB
<i>Wednesday</i>	Upgrades PRCB
<i>Wednesday</i>	Abort Improvement Panel
<i>Wednesday</i>	Advanced Health Monitoring System IWG
<i>Wednesday</i>	Propulsion Systems Integration
<i>Wednesday</i>	SSP Schedules
<i>Wednesday</i>	CPCB
<i>Thursday</i>	SSPPRCB
<i>Thursday</i>	SASCB
<i>Thursday</i>	SSP/ISSP Joint PRCB
<i>Thursday</i>	NIP
<i>Thursday</i>	OMS/RCS
<i>Thursday</i>	Landing and Rollout
<i>Thursday</i>	Landing/Decel PRT
<i>Thursday</i>	RPOWG
<i>Thursday</i>	Avionics Upgrade IPT
<i>Friday</i>	AEFTP
<i>Friday</i>	OFTP



Astronaut Office Representation Shuttle Meetings

<i>During Missions</i>	Mission Management Team Daily
<i>Prior to Launch</i>	Orbiter Readiness Review
<i>Prior to Launch</i>	Rollout Readiness Review
<i>Prior to Launch</i>	FRR Level 3
<i>Prior to Launch</i>	SRB Element Acceptance Review
<i>Prior to Launch</i>	SRB Pre-flight Assessment
<i>Prior to Launch</i>	SRB Preflight Readiness Review
<i>Prior to Launch</i>	SSME Pre-flight Assessment
<i>Prior to Launch</i>	SSME Preflight Readiness Review
<i>Prior to Launch</i>	RSRM Element Acceptance Review
<i>Prior to Launch</i>	RSRM Pre-flight Assessment
<i>Prior to Launch</i>	RSRM Preflight Readiness Review

<i>Prior to Launch</i>	ET Pre-flight Assessment
<i>Prior to Launch</i>	Crew/VITT Tagup (Initial, TCDT, LCD)
<i>Prior to Launch</i>	Launch Count Working Group
<i>Prior to Launch</i>	EMU Checkout/Airlock Closeout Pretest
<i>Prior to Launch</i>	TCDT Orbiter Systems Chart Review
<i>Prior to Launch</i>	LCD Orbiter Systems Chart Review
<i>Prior to Launch</i>	ET Preflight Readiness Review
<i>As Needed</i>	Window PRT
<i>As Needed</i>	WSB PRT
<i>As Needed</i>	MEDS Software
<i>As Needed</i>	CAU Software
<i>As Needed</i>	SSME Acceptance Review
<i>As Needed</i>	SRS Inspections
<i>As Needed</i>	Mode Exercise Meeting (Mode VI-VIII EDW&KSC)



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Astronaut Office Safety Inputs

- **Subject Matter Experts**
 - Later in career
 - Points of Contact
 - Informal Conversations



Astronaut Office Safety Inputs

- **Astronaut Office Positions**
 - **Office White Papers**
 - **Crew Escape**
 - **Inspection Boom**
 - **Operator's Perspective**
 - **Historical Challenges**
 - **Inconsistency, Incorrectness**
 - **Accidents**
 - **Executive Support**
 - **Prime Crew Demands**
 - **Risk / Benefit Bias**



Astronaut Office Shuttle Issues

1		Return to Flight (RTE)
2		External Tank (ET) Enhancements
3		Ascent Imagery
4		Ascent Debris
5	ON HOLD	Crew Fatigue
6	ON HOLD	Crew Certification and Training Facilities (NBL Availability, MDF, STA, VMS, etc.)
7	ON HOLD	TAL Site Security & Talcom Support
8	ON HOLD	Safety Upgrades

9	ON HOLD	Ball Strut Tie Rod Assembly (BSTRA) Ball Cracks
10	ON HOLD	Body Flap Corrosion
11	ON HOLD	IMU
12	ON HOLD	SAIL Down Time
13	ON HOLD	Abort Performance Enhancements
14	ON HOLD	109 Throttles
15	ON HOLD	TAL Reassessment
16	ON HOLD	Training Issues



Astronaut Office Safety Inputs

- **Effectiveness of Personnel**
 - **Emotional Intelligence, Social Skills**
 - **Communication Skills**
 - **When to talk, How to convince**
 - **Technical Competence**
 - **If Trust Broken:**
 - **Mend Relationships**



Astronaut Office Safety Inputs

Report of the Presidential Commission on the Space Shuttle Challenger Accident (In compliance with Executive Order 12546 of February 3, 1986)

Recommendations Section II

• ASTRONAUTS IN MANAGEMENT

- The Commission observes that there appears to be a **departure from the philosophy of the 1960s and 1970s** relating to the use of **astronauts in management positions**. These individuals brought to their positions **flight experience** and a **keen appreciation of operations and flight safety**.
- NASA should **encourage** the transition of **qualified astronauts** into agency **management positions**.
- The function of the **Flight Crew Operations director** should be **elevated** in the NASA organization structure.



Astronaut Office Safety Inputs

- **Active Astronauts – 96**
 - Qualified CDR, PLT, MS
- **Management Astronauts – 46**
 - Management astronauts are experienced astronauts who have been promoted to other positions within NASA, or astronauts on special duty assignments or sabbaticals that make them unavailable for direct support to the Astronaut Office.



Astronaut Office Safety Inputs

Report of the Presidential Commission on the Space Shuttle Challenger Accident

(In compliance with Executive Order 12546 of February 3, 1986)

- **SHUTTLE SAFETY PANEL**

- “NASA should establish an **STS Safety Advisory Panel** reporting to the STS Program Manager. The Charter of this panel should include Shuttle operational issues, launch commit criteria, flight rules, flight readiness and risk management. The panel should **include representation** from the safety organization, mission operations, and the **astronaut office**.”



Astronaut Office Safety Inputs

Report of the Space Shuttle Management Independent Review Team - February 1995 (Kraft Rpt)

OBSERVATIONS:

- “Early in the Mercury Program, the number of NASA people was relatively small...”
- “**Program management** ... over the past 25 years evolved into **isolation** from **center management**.”
- “...The centers involved adopted the **traditional matrix management style**... This allowed both **NASA** and its **contractors** to **function together** with a **complete understanding of...the decision-making process**. **NASA Headquarters** established a **working relationship** with the **centers** ...and it **functioned extremely well** throughout the Apollo and early Space Shuttle Programs.”



Astronaut Office Safety Inputs

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- “The post-Challenger organization modified this, ... **further changes** that have generated **confusion** within and among NASA Headquarters, the centers, and the contractors as to **responsibility** and **decision making**. It is now **increasingly difficult** for center **management** to provide the classical technical **inputs** to **program management** and to provide the customary **checks and balances** that were essential in previous programs.”



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SR&QA:

- “One of the most apparent examples in this regard is the area of SR&QA. As a result of the **Challenger incident**, a ‘**safety shield**’ **philosophy** has evolved creating a **difficult management situation**. Managers, engineers, and business people are **reluctant to make decisions** that **involve risk because of the fear of persecution**. As a result, a parallel and independent **SR&QA element has grown to large proportions**.”



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SAFETY ENVIRONMENT

- “The Challenger incident created a **safety environment** in NASA that is **duplicative and expensive**. **Safety** is one of those terms that can be used to **hide behind** and **prevent** necessary **change and innovation**. The **challenge** lies in requiring NASA and its contractors to **totally revamp these expensive habits** and **still operate a safe and reliable vehicle**.”
- **RECOMMENDATION 7: “Restructure and reduce the overall SR&QA element.”**



Astronaut Office Safety Inputs

Columbia Accident Investigation Board Report

CHAPTER 7: The Accident's Organizational Causes

- “NASA’s initial briefings to the Board on its safety programs espoused a **risk-averse philosophy** that **empowered any employee** to **stop an operation** at the mere glimmer of a problem. Unfortunately, NASA’s views of its safety culture in those briefings **did not reflect reality.**” (p. 177)



Astronaut Office Safety Inputs

- **Inputs or Appeals**
 - **Boom Question**
 - **Strong Objections**
 - **Extra Training**
 - **Procedures (2A.1)**
 - **Solidarity with Mission Operations Directorate**



Astronaut Office Safety Inputs

- **Real Time Safety Inputs**
 - **Engineering**
 - Daily Reports
 - Mission Control Center (MCC) support
 - SPAN
 - **Crew Support Astronauts (CSA)**
 - **CAPCOM**
 - **Management**
 - Mission Management Team (MMT)



Astronaut Office Safety Inputs

- **Post-Flight Crew Reports**
 - **Debriefing Process (Oral)**
 - Many Organizations
 - ~ Three Weeks
 - CDR Sets Tone
 - **Formal Report (Written)**
 - Written by Crew
 - Branch Chief Panel
 - Rigorous Tracking System
 - Programs and Organizations